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What is claimed is:

1. An isolated or substantially purified OMP21 obtainable from a *M. catarrhalis* strain, wherein the apparent molecular weight is about 16 kD to about 20 kD, as determined by SDS-PAGE.

2. The protein of claim 1, comprising the amino acid sequence of any of SEQ ID NOs.: 1 or 7, a sequence substantially homologous thereto, or a fragment thereof.

3. The protein of claim 1, wherein the OMP21 is an outer membrane protein.

4. The protein of claim 1, wherein the OMP21 has a nasopharyngeal binding domain.

5. The protein of claim 1, wherein the strain of *Moraxella catarrhalis* is a virulent clinical isolate.

6. The protein of claim 1, wherein the OMP21 is at least 70 wt% purified.

7. The protein of claim 1, recognizable by an antibody preparation that specifically binds to a peptide having the amino acid sequence of SEQ ID NO: 1 or 7 or a fragment thereof.

8. A peptide fragment of the OMP21 polypeptide of claim 1, which specifically binds to an antibody that specifically binds said OMP21 polypeptide.

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9. An isolated nucleic acid molecule encoding the OMP21 of claim 1, a complementary sequence thereof, a sequence substantially homologous thereto, or any fragment thereof.

10. The nucleic acid molecule of claim 9 wherein the encoded OMP21 comprises the amino acid sequence of any of SEQ ID Nos.: 1 or 7.

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11. An isolated nucleic acid molecule comprising a sequence selected from the following group consisting of:

a) a nucleic acid sequence of any of SEQ ID NO: 2-6 and 8-20, a complementary sequence thereof, a sequence substantially homologous thereto, or any fragment thereof;

b) a nucleic acid sequence encoding the deduced amino acid sequence of SEQ ID NO: 1 or 7, a complimentary sequence thereof, a sequence substantially homologous thereto, or any fragment thereof; and

c) a nucleic acid sequence which hybridizes under stringent conditions to any one of the sequences of a) or b).

12. Plasmid pOMP21X obtainable from *E. coli* Top10F' (pOMP21X), as deposited with the ATCC and assigned accession number _____.

13. A recombinant expression vector adapted for transformation of a host cell, comprising the nucleic acid molecule of claim 9, 10 or 11, or the plasmid of claim 12.

14. A recombinant expression vector adapted for transformation of a host cell, comprising the nucleic acid molecule of claim 9, 10 or 11 and an expression means operatively coupled to a nucleic acid molecule for expression by the host of said OMP21.

15. The recombinant expression vector of claim 14, wherein the expression means includes a nucleic acid portion encoding a leader sequence for secretion or purification from the host cell of said OMP21.

16. A transformed host cell containing an expression vector of claim 13.

17. A transformed host cell containing an expression vector of claim 14.

18. An isolated recombinant OMP21 producible by the transformed host cell of claim 16.

19. An isolated recombinant OMP21 producible by the transformed host cell of claim 17.

20. A recombinant vector adapted for delivery of a sequence encoding OMP21 to a host, comprising the nucleic acid molecule of claim 9, 10 or 11, or the plasmid of claim 12.

21. A recombinant vector adapted for delivery of a sequence encoding OMP21 to a host, comprising the nucleic acid molecule of claim 9, 10 or 11 and an expression means operatively coupled to a nucleic acid molecule for expression by the host of said OMP21.

22. An attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding the OMP21 protein of claim 1 deleted and therefore non-transcribed.

23. The attenuated or inactivated cultivar of claim 22, wherein the cultivar is non-adherent.

24. An attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding the OMP21 protein of claim 1 and OMP106 deleted and therefore non-transcribed.

25. The attenuated or inactivated cultivar of claim 24, wherein the cultivar is non-adherent.

26. A pharmaceutical composition, which may be a prophylactic composition, a therapeutic composition, or an immunogenic composition including a vaccine, comprising an effective amount of at least one component selected from the following group:

a) OMP21;

b) a nucleic acid molecule encoding OMP21, a complementary sequence thereof, a sequence substantially homologous thereto, or any fragment thereof;

c) a nucleic acid molecule having the sequence of SEQ ID NO:6, a complimentary sequence thereto, a nucleic acid sequence which hybridizes under stringent conditions thereto, or a fragment thereof;

d) OMP21, obtainable from a transformed host comprising an expression vector comprising a nucleic acid molecule as defined in b) or c) and expression means operatively coupled to the nucleic acid molecule for expression by the host of said OMP21;

e) a recombinant vector comprising the nucleic acid of b) or c); and

f) a transformed cell comprising the vector of e);

and optionally one or more adjuvants, and optionally one or more pharmaceutically acceptable carriers or diluents.

27. The pharmaceutical composition of claim 26 wherein said composition is a prophylactic composition.

28. The pharmaceutical composition of claim 26 wherein said composition is a therapeutic composition.

29. The pharmaceutical composition of claim 26 further comprising an attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding OMP21 deleted and therefore non-transcribed.

30. The pharmaceutical composition of claim 26 further comprising an attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding OMP21 and OMP106 deleted and therefore non-transcribed.

31. The pharmaceutical composition of claim 26 wherein the component is combined with, fused to, or conjugated to one or more other components, selected from the group consisting of lipids, carbohydrates, proteins, an attenuated whole organism, and an inactivated whole organism.

32. The pharmaceutical composition of claim 31 wherein the lipid is a phospholipid.

33. The pharmaceutical composition of claim 31 wherein the carbohydrate is a lipopolysaccharide.

34. The pharmaceutical composition of claim 31 wherein the whole organism is selected from the group consisting of *Moraxella, Neisseria, Pseudomonas, Streptococcus,* and *Haemophilus*.

35. The pharmaceutical composition of claim 31 wherein the component is combined with the other component, and wherein the other component is a protein or a carbohydrate from *Moraxella, Neisseria, Pseudomonas, Streptococcus,* or *Haemophilus*.

36. The pharmaceutical composition of claim 31 or claim 35, wherein the other component is OMP106.

37. An immunogenic composition, comprising at least one component selected from the following group:

a) OMP21;

b) a nucleic acid molecule encoding OMP21, a complementary sequence thereof, a sequence substantially homologous thereto, or any fragment thereof;

c) a nucleic acid molecule having the sequence of SEQ ID NO:6, a complimentary sequence thereto, a nucleic acid sequence which hybridizes under stringent conditions thereto, or a fragment thereof;

d) OMP21, obtainable from a transformed host comprising an expression vector comprising a nucleic acid molecule as defined in b) or c) and expression means operatively coupled to the nucleic acid molecule for expression by the host of said OMP21;

e) a recombinant vector comprising the nucleic acid of b) or c); and

f) a transformed cell comprising the vector of e); and optionally one or more adjuvants, and optionally one or more pharmaceutically acceptable carriers or diluents, wherein said immunogenic composition produces an immune response when administered to a host.

38. The immunogenic composition of claim 37 wherein said composition is a prophylactic composition.

39. The immunogenic composition of claim 37 wherein said composition is a therapeutic composition.

40. The immunogenic composition of claim 37 further comprising an attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding OMP21 deleted and therefore non-transcribed.

41. The immunogenic composition of claim 37 further comprising an attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding for OMP21 and OMP106 deleted and therefore non-transcribed.

42. The immunogenic composition of claim 37 wherein the component is combined with, fused to, or conjugated to one or more other components, selected from the group consisting of lipids, carbohydrates, proteins, an attenuated whole organism and an inactivated whole organism.

43. The immunogenic composition of claim 42 wherein the whole organism is selected from the group consisting of *Moraxella, Neisseria, Pseudomonas, Streptococcus,* and *Haemophilus*.

44. The immunogenic composition of claim 42 wherein the component is combined with the other component and wherein the other component is a protein or a carbohydrate from *Moraxella, Neisseria, Pseudomonas, Streptococcus,* or *Haemophilus*.

45. The immunogenic composition of claim 42 or claim 44 wherein the other component is OMP106.

46. A vaccine, comprising at least one component selected from the following group:

a) OMP21;

b) a nucleic acid molecule encoding OMP21, a complementary sequence thereof, a sequence substantially homologous thereto, or any fragment thereof;

c) a nucleic acid molecule having the sequence of SEQ ID NO:6, a complimentary sequence thereto, a nucleic acid sequence which hybridizes under

stringent conditions thereto, or a fragment thereof;

d) OMP21, obtainable from a transformed host comprising an expression vector comprising a nucleic acid molecule as defined in b) or c) and expression means operatively coupled to the nucleic acid molecule for expression by the host of said OMP21;

e) a recombinant vector comprising the nucleic acid of b) or c); and

f) a transformed cell comprising the vector of e); and optionally one or more adjuvants, and optionally one or more pharmaceutically acceptable carriers or diluents, wherein said vaccine produces an immune response when administered to a host.

47. The vaccine of claim 46 further comprising an attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding OMP21 deleted and therefore non-transcribed.

48. The vaccine of claim 46 further comprising an attenuated or inactivated cultivar of *M. catarrhalis* wherein the cultivar has been genetically manipulated to have the nucleic acid encoding OMP21 and OMP106 deleted and therefore non-transcribed.

49. The vaccine of claim 46 wherein the component is combined with, fused to, or conjugated to one or more other components, selected from the group consisting of lipids, carbohydrates, proteins, an attenuated whole organism and an inactivated whole organism.

50. The vaccine of claim 49 wherein the whole organism is selected from the group consisting of *Moraxella, Neisseria, Pseudomonas, Streptococcus,* or *Haemophilus.*

51. The vaccine of claim 49 wherein the component is combined with the other component, and wherein the other component is a protein or a carbohydrate from *Moraxella, Neisseria, Pseudomonas, Streptococcus,* or *Haemophilus*.

52. The vaccine of claim 49 or 51 wherein the other component is OMP106.

53. A method of producing an immune response in an animal comprising administering said animal with an effective amount of the pharmaceutical composition of claim 26, the immunogenic composition of claim 36, or the vaccine of claim 46.

54. Antisera raised against the pharmaceutical composition of claim 26, the immunogenic composition of claim 37, or the vaccine of claim 46.

55. An isolated antibody present in the antisera of claim 54 that specifically binds one or more of the components present in the pharmaceutical composition, immunogenic composition or vaccine.

56. An isolated antibody that specifically binds the OMP21 polypeptide of claim 1.

57. The isolated antibody of claim 55, which is a cytotoxic antibody that mediates complement killing of *Moraxella catarrhalis*.

58. The isolated antibody of claim 56, which is a cytotoxic antibody that mediates complement killing of *Moraxella catarrhalis*.

59. A method for detecting anti-*M. catarrhalis* antibodies in a test sample comprising the steps of:

a) contacting a test sample with the pharmaceutical composition of claim 26 or the immunogenic composition of claim 37 to form, in the presence of anti-*M. catarrhalis* antibodies, *M. catarrhalis* antigen: anti-*M. catarrhalis* antibody immunocomplexes, and

b) detecting any said immunocomplexes formed during step a) as an indication of the presence of said anti-*M. catarrhalis* antibodies in the test sample.

60. The method of claim 59 further comprising

c) measuring the amount of immunocomplexes formed.

61. A diagnostic kit for detecting antibodies to *M. catarrhalis*, said kit comprising the pharmaceutical composition of claim 26 or immunogenic composition of claim 37, a container means for contacting said composition with a test sample suspected of having antibodies to *M. catarrhalis* and a reagent means for detecting *M. catarrhalis* antigen: anti-*M. catarrhalis* antibody immunocomplexes formed between said composition and said antibodies.

62. A method for detecting the presence of *M. catarrhalis* in a test sample comprising the steps of:

a) contacting a test sample with the antibodies of claim 55 or 56 for a time sufficient to allow said antibodies to bind *M. catarrhalis*, if present, to form *M. catarrhalis*: anti-*M. catarrhalis* antibody immunocomplexes, and

b) detecting said immunocomplexes formed during step a) as an indication of the presence of said *M. catarrhalis* in the test sample.

63. The method of claim 62 further comprising

c) measuring the amount of immunocomplexes formed.

64. A diagnostic kit for detecting the presence of *M. catarrhalis*, said kit comprising the antibodies of claim 52 or claim 54, a container means for connecting said antibodies with a test sample suspected of having said *M. catarrhalis* and a reagent means for measuring *M. catarrhalis*: anti-*M. catarrhalis* antibody immunocomplexes formed between said antibodies and said *M. catarrhalis*.

65. A method for determining the presence of nucleic acid encoding OMP21 in a sample, comprising the steps of:

a) contacting a sample with the nucleic acid molecule of claim 9 or claim 11 to produce duplexes comprising the nucleic acid molecule and any said nucleic acid molecule encoding the OMP21 in the sample and specifically hybridizable therewith; and

b) detecting duplexes produced.

66. A diagnostic kit for determining the presence of nucleic acid encoding OMP21 in a sample, comprising:

a) the nucleic acid molecule of claim 9 or claim 11;

b) a means for contacting the nucleic acid with a sample to produce duplexes comprising the nucleic acid molecule and any said nucleic acid molecule encoding the OMP21 in the sample and specifically hybridizable therewith; and

c) means for detecting duplexes produced.

67. A method of preventing, treating or ameliorating a disorder related to *M. catarrhalis* in an animal in need of such treatment comprising administering an effective amount of the pharmaceutical composition of claim 26, the immunogenic composition of claim 37 or the vaccine composition of claim 46.

68. The method of claim 67, wherein the disorder is selected from the group consisting of a *M. catarrhalis*

bacterial infection, otitis media, respiratory infections, sinusitis and pneumonia.

69. The composition of any one of claims 26, 37, or 46 formulated for *in vivo* administration to a host to confer protection against disease or treatment therefor caused by *M. catarrhalis*.

70. The composition of any one of claims 26, 37, or 46 formulated as a microparticle, capsule, or liposome preparation.

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